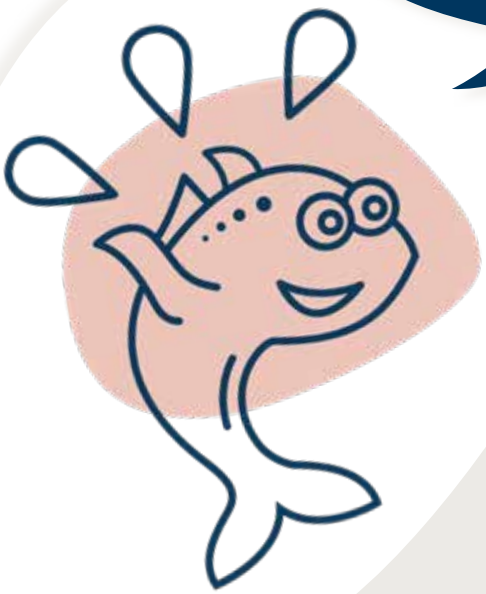
UNLOCKING THE SEVERN

Activity Pack

Help the shad with some epic engineering!

FOR KIDS!



UNLOCKING THE SEVERN · SEVERN RIVERS TRUST · Canal & River Trust · Environment Agency · NATURAL ENGLAND · HERITAGE FUND · Life · NATURA 2000

Helping the shad with epic engineering

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Background information:

The twaite shad is type of fish that is part of the herring family. It spends most of its time living out at sea, but once a year in the month of May it makes a very special journey back up the river to lay its eggs (spawn). Shad like to lay their eggs in clean water and gravel, conditions found further up the river, away from the sea. During the industrial revolution in the mid-1800s, humans built barriers called locks and weirs to help boats move goods up and down the river. Unfortunately for the shad, and many other fish, these weirs were difficult to jump over and they struggled to reach their old spawning grounds. Over time the number of shad declined, but help is at hand! Fish passes built by the Unlocking the Severn project team are helping shad and other fish up and over the weirs so they can continue their journeys to spawn. The following activities will teach you more about the story of the shad and will ask you to design a fish pass to help them on their way!

What you will need:

All you need for these activities is a pencil and paper. There are opportunities for extra creativity, but they are optional.

Activity!

First things first, lets introduce the hero of our story...the twaite shad!

Look closely at the image of the shad and name three features that stand out to you:

1.

2.

3.

Activity!

Below are images and descriptions of the 4 stages of the twaite shad's life cycle. Your first task to match the descriptions with the pictures, draw a line connecting them. The second task is to place them in order from hatching to adulthood. Either print and cut them our or why not draw your own!

In time the larvae grows into a baby fish called a fry. These fry are smaller than adult fish and are silver in colour, as they don't have the distinctive markings of adulthood yet.

Once fully matured, adult twaite shad have distinctive spots down their back and are around 30 cm long. They spend most of their lives at sea, but return to the river once a year to lay their eggs. This is called spawning. Once they have laid their eggs the lifecycle is ready to start again. Amazing!

When the egg hatches, a larvae emerges. Larvae are almost transparent which acts as a camouflage to keep them safe from predators. Can you see the little pouch on their tummy? That is a yolk-sac and is like a lunchbox. It contains enough nourishment for them until they are capable of feeding themselves.

All twaite shad start their lives as an egg. These eggs look like beautiful pearls shimmering in the river gravels. After a few days, two dark dots develop inside which is the beginning of the fish's eyes growing!

Fun Fact

Did you know that a single female twaite shad will lay 200,000 eggs in a single season?! That's a lot of eggs!

Answers:

The twaite shad life cycle!

Shad Lifecycle

Egg

1. All twaite shad start their lives as an egg. These eggs look like beautiful pearls shimmering in the river gravels. After a few days, two dark dots develop inside which is the beginning of the fish's eyes growing!

Larvae

2. When the egg hatches, a larvae emerges. Larvae are almost transparent which acts as a camouflage to keep them safe from predators. Can you see the little pouch on their tummy? That is a yolk-sac and is like a lunchbox. It contains enough nourishment for them until they are capable of feeding themselves.

Fry

3. In time the larvae grows into a baby fish called a fry. These fry are smaller than adult fish and are silver in colour, as they don't have the distinctive markings of adulthood yet.

Adult

4. Once fully matured, adult twaite shad have distinctive spots down their back and are around 30 cm long. They spend most of their lives at sea, but return to the river once a year to lay their eggs. This is called spawning. Once they have laid their eggs the lifecycle is ready to start again. Amazing!

What an amazing lifecycle, and an epic **migration** (journey) from the sea to the river! But... there is a problem facing the shad in their quest to spawn upstream... continue on to the next page to find out more...

The problem for Twaite Shad

During the 1800s, Britain was undergoing an epic shift into the Industrial Revolution. Before we had motorways, aeroplanes or even railways, rivers were very important as a way of moving goods around the country for trade.

However, rivers are a force of nature and therefore present challenges for navigation. Variations in rainfall can affect river levels; if there is too much rain this can result in flooding, and if there is too little rain this can result in drought. There are also sections of the riverbed which are particularly steep and therefore difficult for boats to move over.

In order to overcome these challenges and make the river reliably navigable, Victorian engineers designed a clever system of lock gates and weirs to maintain water flow at key locations. Watch this video from Canal & River Trust to see how a lock works https://www.youtube.com/watch?v=dmZ7hBMTY8Q (if you can't click the link, search Youtube for How a Lock Works).

But... these weirs are a problem for fish who want to migrate upstream to spawn!

Fun Fact

Shad like deep smooth-flowing water without too many bubbles.

Fun Fact

Salmon can jump up to 3 metres, but shad are not adapted to jump.

Activity!

Look at the weir above and list some reasons why you think fish like the shad would find it hard to get over it.

1.

2.

3.

Fun Fact

Shad like to swim in groups and like to be able to see each other when they are swimming.

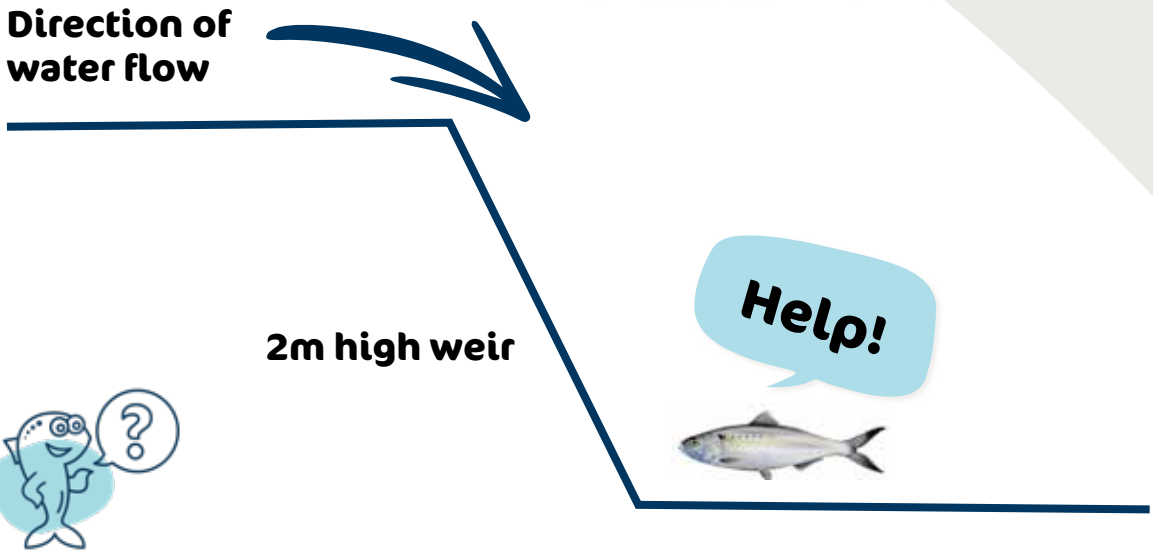
Activity!

The shad need you! Design something that will help the shad get over the weir. Either draw your design onto the template below or have a go at building something in 3D!

Drape a blue cloth off a chair and you have a weir. Get creative, use cardboard, paper, material etc and build something to help those shad! When you have finished, look at the next page to see our solution.

There are a few things that the shad don't like about the weir:

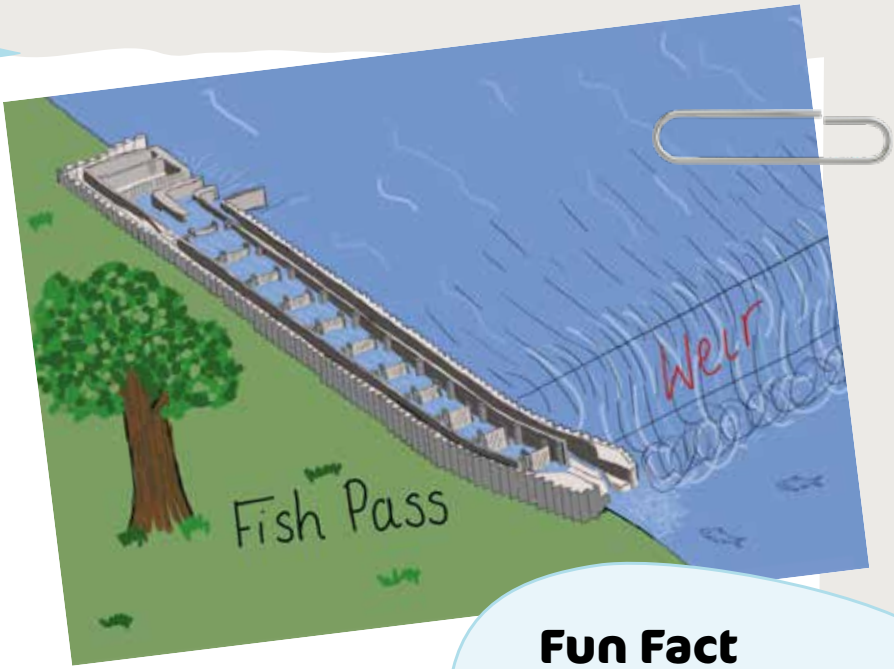
The weir is too **tall**
The weir is too **steep**
The water is too **shallow**
The water is too **bubbly**
The water is too **fast flowing**



What did you design?
What successes did you have?
What challenges did you come across?

Fish passes!

Unlocking the Severn have worked hard to design fish passes to help the twaite shad, and lots of other fish, to get over the weirs and continue their journey to spawn. This is a fish pass and works a bit like a staircase for the shad and other fish. Instead of having to make one big leap over the weir they can make lots of small jumps and climb to the top. Just like you would use a staircase to climb get to the first floor in a building.



Fun Fact

This fish pass will be 100m long. That is about the length of a football pitch!

Activity!

Write a poem or short story about a shad using the fish pass for the first time and being able to access new spawning grounds.

Take it further:

Our engineers would love you to think even more about your design and consider challenges including cost, building materials, limitations to space, public perception and safety to workers. How would these affect your plans?

Complete the other exciting activity packs found on the Unlocking the Severn website by visiting https://www.unlockingthesevern.co.uk/